

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

We claim:

1-4. (Cancelled)

5. (Original) A method of forming multiple spacer widths on a substrate, comprising:

(a) providing a substrate with isolation regions and a plurality of transistor regions including first, second, and third transistor regions comprised of a dielectric layer on said substrate between said isolation regions;

(b) forming a first gate electrode on said dielectric layer in said first transistor region, a second gate electrode on said dielectric layer in said second transistor region, and a third gate electrode on said dielectric layer in said third transistor region, said first gate electrode having a greater thickness than said second gate electrode and said second gate electrode having a greater thickness than said third gate electrode;

(c) forming an oxide layer on the substrate and on the gate electrodes in said plurality of transistor regions; and

(d) etching said oxide layer to form spacers with a first width adjacent to said first gate electrode, spacers having a second width less than said first width adjacent to said second gate electrode, and spacers having a third width less than said second width adjacent to said third gate electrode.

6. (Original) The method of claim 5 further comprised of forming a fourth gate electrode on said dielectric layer in a fourth transistor region before forming said oxide layer and wherein the thickness of the fourth gate electrode is less than the thickness of said third gate electrode and

wherein etching said oxide layer forms spacers having a fourth width less than said third width adjacent to said fourth gate electrode.

7. (Currently Amended) ~~The method of claim 5 further comprising the step of~~ A method of forming multiple spacer widths on a substrate, comprising:

(a) providing a substrate with isolation regions and a plurality of transistor regions including first, second, and third transistor regions comprised of a dielectric layer on said substrate between said isolation regions;

(b) forming a first gate electrode on said dielectric layer in said first transistor region, a second gate electrode on said dielectric layer in said second transistor region, and a third gate electrode on said dielectric layer in said third transistor region, said first gate electrode having a greater thickness than said second gate electrode and said second gate electrode having a greater thickness than said third gate electrode;

(c) forming an oxide layer on the substrate and on the gate electrodes in said plurality of transistor regions;

(d) etching said oxide layer to form spacers with a first width adjacent to said first gate electrode, spacers having a second width less than said first width adjacent to said second gate electrode, and spacers having a third width less than said second width adjacent to said third gate electrode; and

(e) forming an anti-reflective coating (ARC) over said first and second gate electrodes before depositing said oxide layer wherein the thickness of said ARC over said second gate electrode is thinner than the thickness of said ARC over said first gate electrode.

8. (Original) The method of claim 7 wherein said ARC is comprised of silicon oxynitride that is deposited by a CVD or PECVD method and has a thickness between about 100 and 2000 Angstroms.

9. (Original) The method of claim 7 further comprised of removing said ARC after etching said oxide layer.

10. (Original) A method of forming multiple spacer widths on a substrate, comprising:

(a) providing a substrate with isolation regions and a plurality of transistor regions including first, second, and third transistor regions comprised of a dielectric layer on said substrate between said isolation regions;

(b) forming a first gate electrode on said dielectric layer in said first transistor region, a second gate electrode on said dielectric layer in said second transistor region, and a third gate electrode on said dielectric layer in said third transistor region, said first gate electrode having a thickness equal to the thickness of said second gate electrode and said third gate electrode having a thickness less than the thickness of said first and second gate electrodes;

(c) forming an oxide layer on said substrate in the plurality of transistor regions;

(d) forming a first silicon nitride layer on said oxide layer in said first transistor region;

(e) forming a second silicon nitride layer on said first silicon nitride layer in said first transistor region and on said oxide layer in said second and third transistor regions; and

(f) etching through said silicon nitride layers and through said oxide layer to form spacers having a first width adjacent to said first electrode, spacers having a second width less than said first width adjacent to said second gate electrode, and spacers having a third width less than said second width adjacent to said third gate electrode.

11. (Original) The method of claim 10 further comprised of forming a fourth gate electrode having a thickness less than the thickness of said third gate electrode on said dielectric layer in a fourth transistor region before forming said oxide layer, forming a third silicon nitride layer on said second silicon nitride layer in said first, second, and third transistor regions and on said oxide layer in the fourth transistor region, and wherein said etching forms spacers having a fourth width less than said third width adjacent to said fourth gate electrode.

12-14. (Cancelled)

15. (Original) A transistor structure, comprising:

(a) a semiconductor substrate having isolation regions and a plurality of transistor regions including first, second, and third transistor regions comprised of a dielectric layer formed on said substrate between said isolation regions;

(b) a gate electrode having a first thickness formed on said dielectric layer in said first transistor region, a gate electrode having a second thickness formed on said dielectric layer in said second transistor region, and a gate electrode having a third thickness formed on said dielectric layer in said third transistor region;

(c) oxide spacers having a width formed adjacent to said gate electrodes in said first, second, and third transistor regions; and

(d) silicon nitride spacers having a first width formed on said oxide spacers in said first transistor region, silicon nitride spacers having a second width less than said first width formed on said oxide spacers in said second transistor region, and silicon nitride spacers having a third width less than said second width formed on said oxide spacers in said third transistor region.

16. (Currently Amended) ~~The transistor structure of claim 15~~ A transistor structure, comprising:

(a) a semiconductor substrate having isolation regions and a plurality of transistor regions including first, second, and third transistor regions comprised of a dielectric layer formed on said substrate between said isolation regions;

(b) a gate electrode having a first thickness formed on said dielectric layer in said first transistor region, a gate electrode having a second thickness formed on said dielectric layer in said second transistor region, and a gate electrode having a third thickness formed on said dielectric layer in said third transistor region;

(c) oxide spacers having a width formed adjacent to said gate electrodes in said first, second, and third transistor regions; and

(d) silicon nitride spacers having a first width formed on said oxide spacers in said first transistor region, silicon nitride spacers having a second width less than said first width formed on said oxide spacers in said second transistor region, and silicon nitride spacers having a third width less than said second width formed on said oxide spacers in said third transistor region;

wherein said first thickness, and said second thickness, ~~and said third thickness~~ are equivalent.

17. (Currently Amended) The transistor structure of claim ~~15~~ 16 wherein ~~said first thickness is equivalent to said second thickness and~~ said first thickness is greater than said third thickness.

18. (Original) The transistor structure of claim 15 wherein the width of said oxide spacers is between about 10 and 1000 Angstroms.

19. (Original) The transistor structure of claim 15 wherein the first, second, and third widths of said silicon nitride spacers are between about 10 and 1000 Angstroms.

20. (Original) The transistor structure of claim 15 further comprised of a fourth gate electrode formed in a fourth transistor region, and oxide spacers formed adjacent to said fourth gate electrode, and silicon nitride spacers having a fourth width that is less than said third width formed on said oxide spacers.

21. (Original) A transistor structure, comprising:

(a) a semiconductor substrate having isolation regions and a plurality of transistor regions including first, second, and third transistor regions comprised of a dielectric layer formed on said substrate between said isolation regions;

(b) a gate electrode having a first thickness formed on said dielectric layer in said first transistor region, a gate electrode having a second thickness formed on said dielectric layer in said second transistor region, and a gate electrode having a third thickness formed on said dielectric layer in said third transistor region;

(c) oxide spacers having a first width formed adjacent to said gate electrode in the first transistor region, oxide spacers having a second width that is less than said first width formed adjacent to said gate electrode in the second transistor region, and oxide spacers having a third width less than said second width formed adjacent to said gate electrode in the third transistor region.

22. (Original) The transistor structure of claim 21 wherein said first thickness is greater than said second thickness and said second thickness is greater than said third thickness.

23. (Original) The transistor structure of claim 21 wherein said first thickness, said second thickness, and said third thickness are equivalent.

24. (Original) The transistor structure of claim 21 wherein the width of said oxide spacers is between about 10 and 1000 Angstroms.

25. (Original) The transistor structure of claim 21 further comprised of a fourth gate electrode having a fourth thickness formed in a fourth transistor region and oxide spacers having a fourth width that is less than said third width formed adjacent to said fourth gate electrode.